

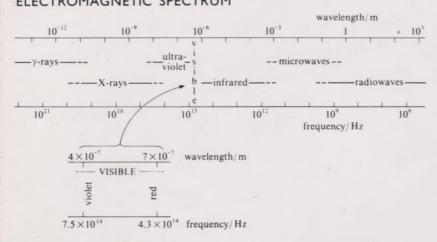
Unit I Science and the planet Earth

Unit 2
Measuring the Solar System



### USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

#### ELECTROMAGNETIC SPECTRUM



#### PHYSICAL CONSTANTS

 $1 \text{ GeV/}c^2 \approx 1.783 \times 10^{-27} \text{ kg}$ 

Symbol	Quantity	Approximate value
G	gravitational constant	$6.672 \times 10^{-11} \mathrm{N}\mathrm{m}^2\mathrm{kg}^{-2}$
С	speed of light in a vacuum	$2.998 \times 10^{8} \mathrm{ms^{-1}}$
h	Planck's constant	$6.626 \times 10^{-34} \mathrm{J}\mathrm{s}$
е .	magnitude of the charge of the electron	$1.602 \times 10^{-19} \mathrm{C}$
m <sub>e</sub>	mass of the electron	$9.110 \times 10^{-31} \mathrm{kg}$
$m_{\rm n}$	mass of the neutron	$1.675 \times 10^{-27} \mathrm{kg}$
$m_{\rm p}$	mass of the proton	$1.673 \times 10^{-27} \mathrm{kg}$

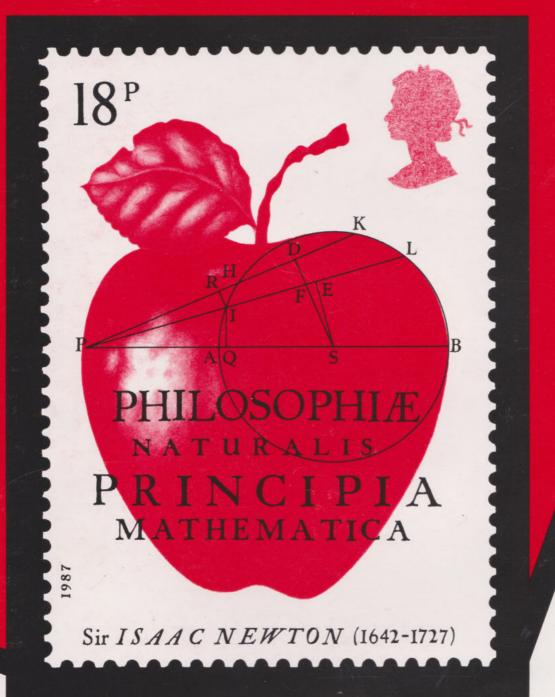
#### USEFUL QUANTITIES AND CONVERSIONS

OSET OF GOVERNMENT OF	A V E K 3 I O I N 3
$\pi \approx 3.142$	Earth radius (equatorial) $\approx 6.38 \times 10^6 \mathrm{m}$
1 mile $\approx 1.609 \text{ km}$ 1 kilometre (km) $\approx 0.6214 \text{ mile}$	circumference of the Earth (distance round the Equator) $\approx 4.01 \times 10^7 \text{m}$
1 inch = 2.54 cm 1 centimetre (cm) $\approx 0.3937$ inch	radius of the Moon $\approx 1.74 \times 10^6\text{m}$
1 kilocalorie ≈ 4 187 J	radius of the Sun $\approx 6.96 \times 10^8  \text{m}$
1 electronvolt (eV) $\approx 1.602 \times 10^{-19} \text{J}$ 1 radian $\approx 57.296$ degrees	Earth–Sun distance (i.e. orbital radius of the Earth) $\approx 1.50 \times 10^{11}$ m
1 degree ≈ 0.01745 radian	Earth-Moon distance (i.e. orbital

### S102 UNITS

radius of the Moon)  $\approx 3.84 \times 10^8 \,\mathrm{m}$ 

1 Science and the planet Earth		
	23	
seismology and the Earth's		
	26	
9 Energy	27	
11-12 Atomic structure 47		
13-14 Chemical reactions and the		

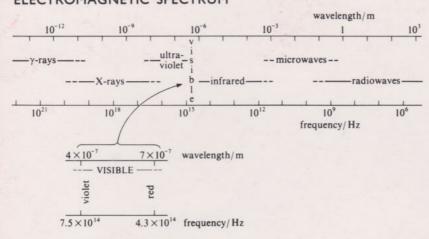


Unit 3 Motion under gravity

Unit 4
Practical work in science

### USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

#### **ELECTROMAGNETIC SPECTRUM**



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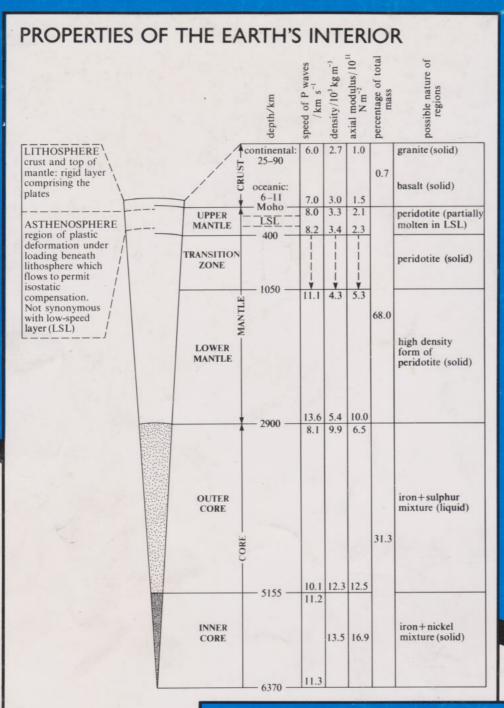
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		19	Life and evolution
2	Measuring the Solar System		Inheritance and cell division
			Generand evolution
4			
		24	
			Geological time and Earth
13-14			Quantum mechanics: an
	Chemical equilibrium		Quantum mechanics; atoms and
	Chemical energetics		
	The chemistry of carbon		The search for fundamental
			particles

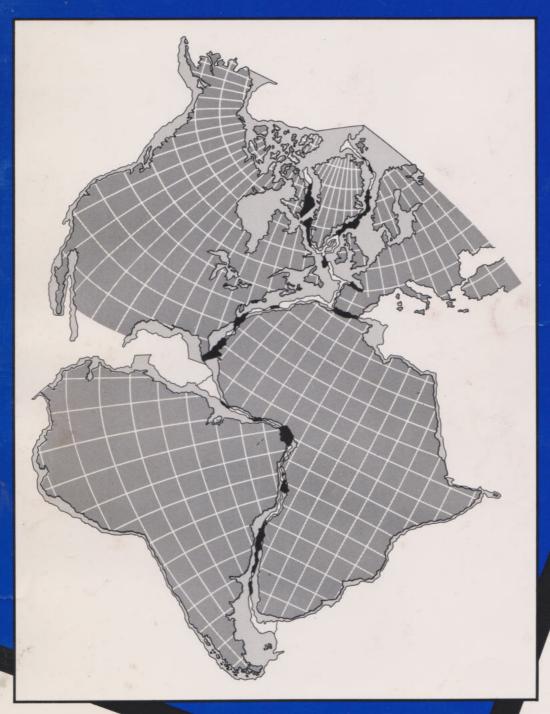


Units 5-6
Into the Earth: earthquakes, seismology and the Earth's magnetism

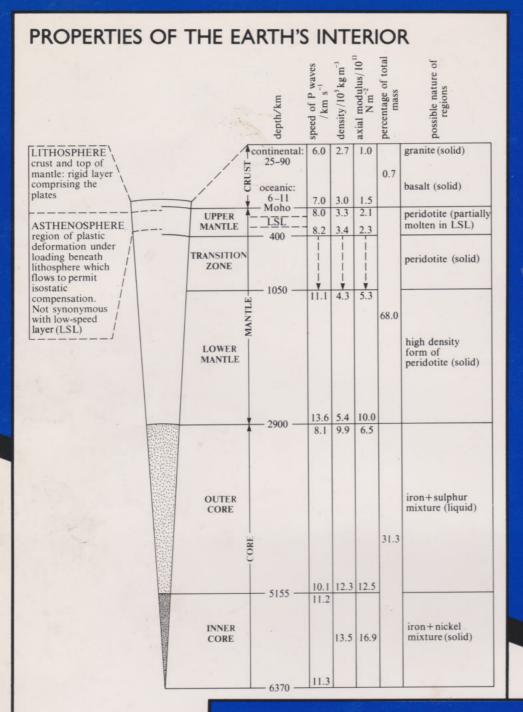


### SIO2 UNITS

Science and the planet Earth Life and evolution Measuring the Solar System Inheritance and cell division Motion under gravity Practical work in science Into the Earth: earthquakes. 21 22 23 24 Genes and evolution Biochemistry Physiology DNA: molecular aspects of seismology and the Earth's genetics magnetism Plate tectonics: a revolution in the Earth sciences Ecology Modelling the behaviour of light Geological time and Earth 28-29 Chemical reactions and the Quantum mechanics: an Periodic Table Chemical equilibrium Chemical energetics



Units 7-8
Plate tectonics:
a revolution in the Earth sciences



- Science and the planet Earth Measuring the Solar System Motion under gravity Practical work in science Into the Earth: earthquakes, seismology and the Earth's
- magnetism Plate tectonics: a revolution in the Earth sciences
- Energy Modelling the behaviour of light Atomic structure
- 13-14 Chemical reactions and the
- Periodic Table Chemical equilibrium
- Chemical energetics
- 17-18 The chemistry of carbon compounds

- Life and evolution
- 20 Inheritance and cell division
- Genes and evolution
- Biochemistry
- 23 24
- Physiology DNA: molecular aspects of
- genetics Ecology
- 25 26
- Biology reviewed
- Earth materials and processes
- Geological time and Earth history
- 30 Quantum mechanics: an introduction
- Quantum mechanics: atoms and
- The search for fundamental 32 particles

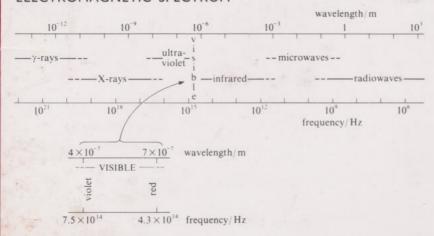


Unit 9 Energy

Unit 10 Modelling the behaviour of light

### USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

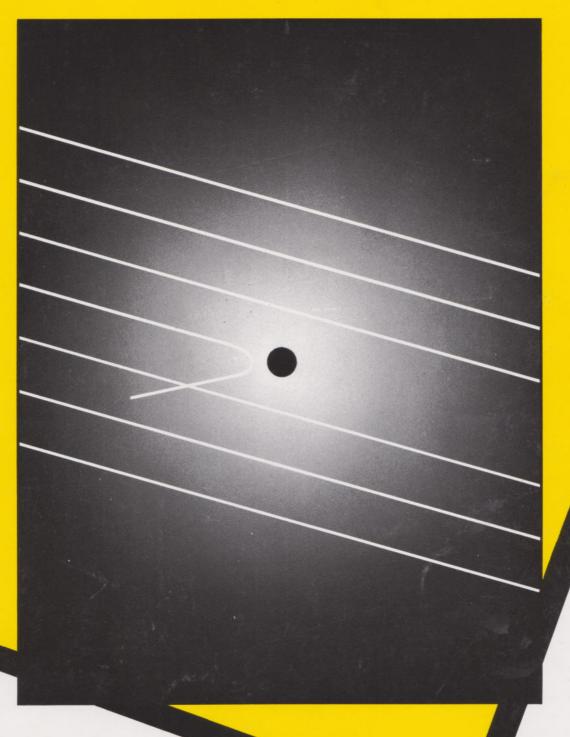
#### ELECTROMAGNETIC SPECTRUM



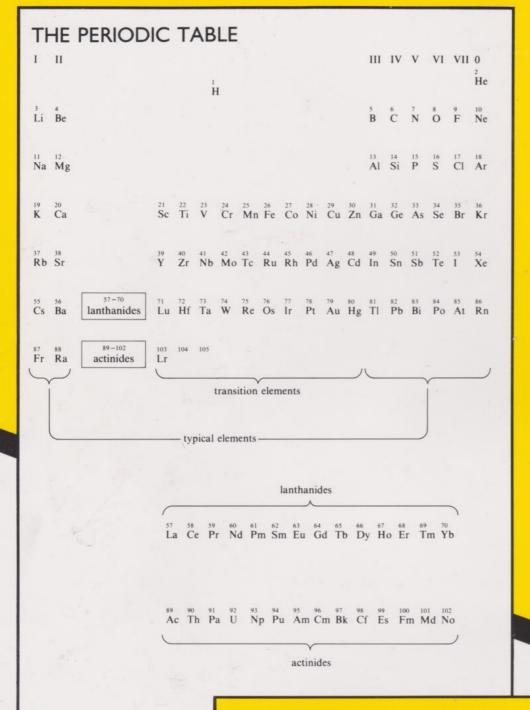
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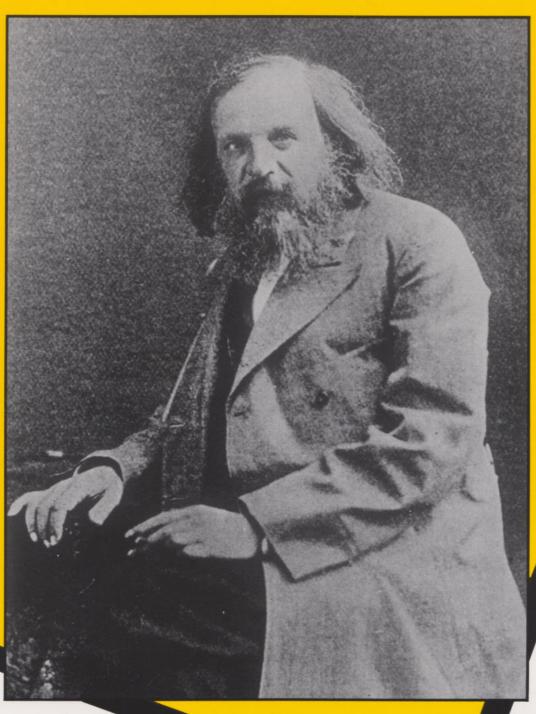
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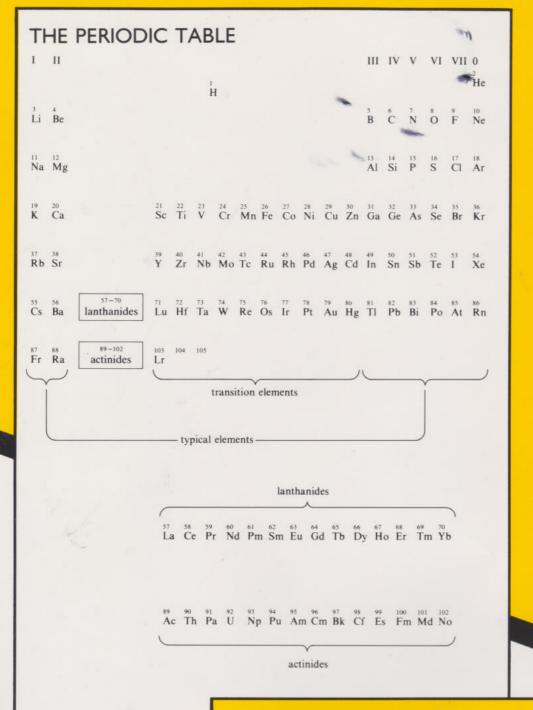
Units II-I2 Atomic structure



Science and the planet Earth	19	Life and evolution
Measuring the Solar System	20	Inheritance and cell division
Motion under gravity	21	Genes and evolution
Practical work in science	22	Biochemistry
Into the Earth: earthquakes,	23	Physiology
	24	DNA: molecular aspects of
G.		genetics
Plate tectonics: a revolution in	25	Ecology
the Earth sciences	26	Biology reviewed
Energy	27	Earth materials and processes
	28-29	Geological time and Earth
		history
	30	Quantum mechanics: an
		introduction
	31	Quantum mechanics: atoms and
		nuclei
	32	The search for fundamental
		particles
compounds		particios
	Measuring the Solar System Motion under gravity Practical work in science Into the Earth: earthquakes, seismology and the Earth's magnetism Plate tectonics: a revolution in the Earth sciences Energy Modelling the behaviour of light	Measuring the Solar System 20 Motion under gravity 21 Practical work in science 22 Into the Earth: earthquakes, 23 seismology and the Earth's 24 magnetism Plate tectonics: a revolution in 25 the Earth sciences 26 Energy 27 Modelling the behaviour of light 28–29 Atomic structure Chemical reactions and the 30 Periodic Table Chemical equilibrium 31 Chemical energetics The chemistry of carbon 32

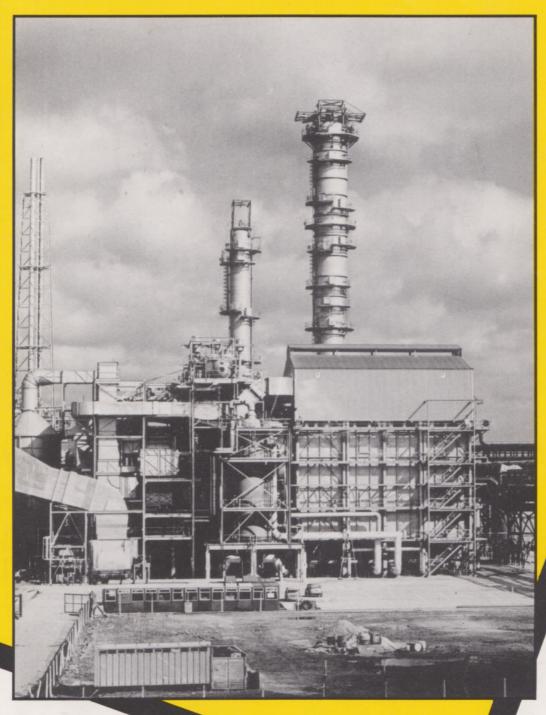


Units 13-14 Chemical reactions and the Periodic Table



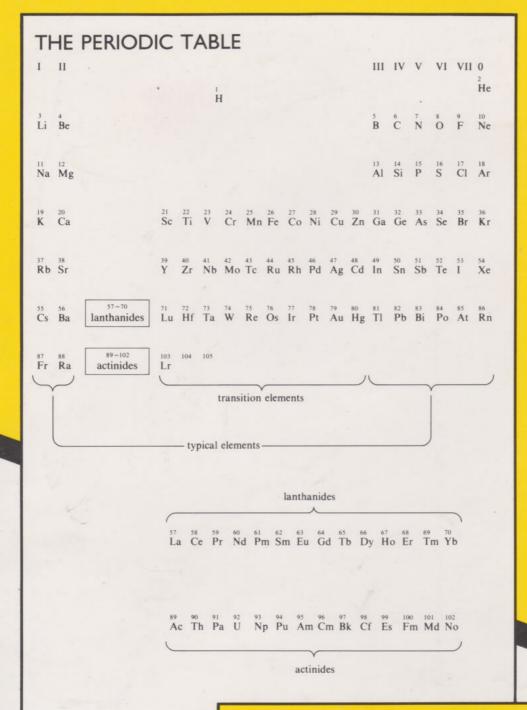
### SI02 UNITS

1	Science and the planet Earth	19	Life and evolution
2	Measuring the Solar System	20	Inheritance and cell division
3	Motion under gravity	21	Genes and evolution
4	Practical work in science	22	Biochemistry
56	Into the Earth: earthquakes,	23	Physiology
	seismology and the Earth's	24	DNA: molecular aspects of
	magnetism		genetics
7-8	Plate tectonics: a revolution in	25	Ecology
	the Earth sciences	26	Biology reviewed
9	Energy	27	Earth materials and processes
10	Modelling the behaviour of light	28-29	Geological time and Earth
11-12	Atomic structure		history
13-14	Chemical reactions and the	30	Quantum mechanics: an
	Periodic Table		introduction
15	Chemical equilibrium	31	Quantum mechanics: atoms and
16	Chemical energetics		nuclei
17-18	The chemistry of carbon	32	The search for fundamental
	compounds		particles



Unit 15 Chemical equilibrium

Unit 16 Chemical energetics



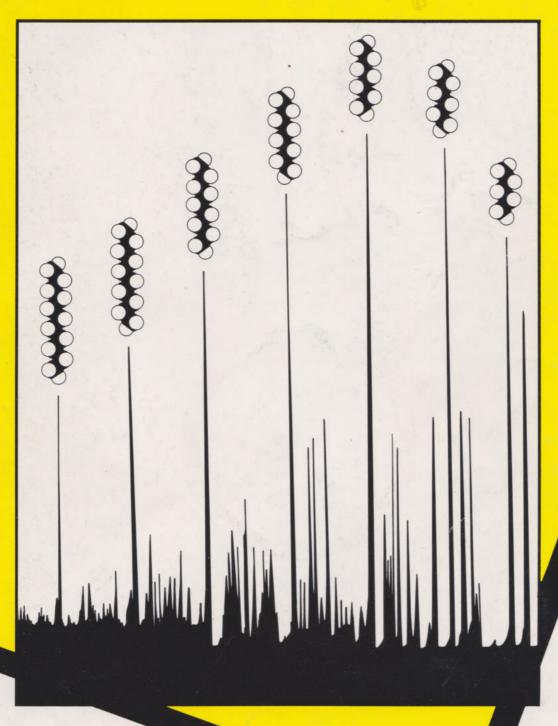
### SI02 UNITS

1	Science and the planet Earth	19	Life and evolution
2	Measuring the Solar System	20	Inheritance and cell division
3	Motion under gravity	21	Genes and evolution
4	Practical work in science	22	Biochemistry
56	Into the Earth: earthquakes,	23	Physiology
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15	Chemical equilibrium	31	Quantum mechanics: atoms
16	Chemical energetics		nuclei
17–18	The chemistry of carbon compounds	32	The search for fundamental particles

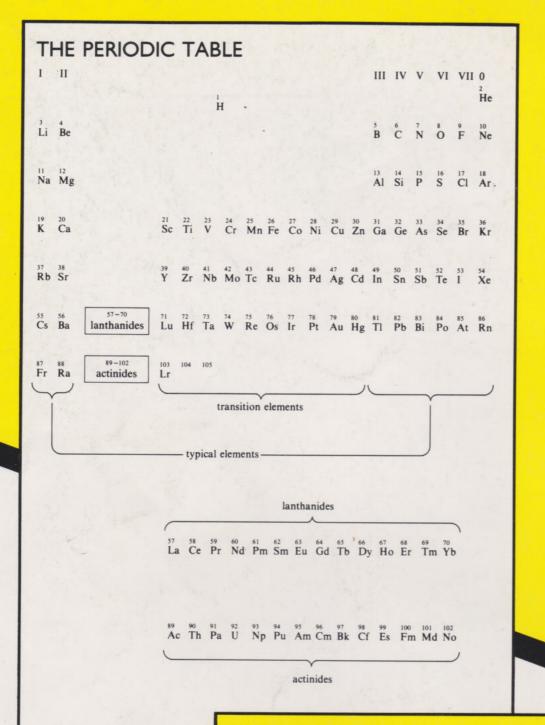


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Units 17–18
The chemistry of carbon compounds



### SI02 UNITS

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nemical eq	brium		31	Quantum mechanics: atoms and
ne chemist mpounds			32	The search for fundamental particles
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Unit 19 Life and evolution

Unit 20 Inheritance and cell division

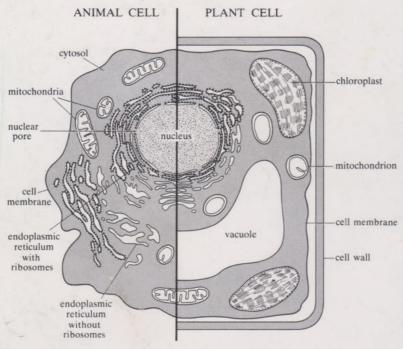
Unit 21 Genes and evolution

### USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

All cellular organisms contain these four biopolymers (made up of the monomers shown below).

Biopolymers: polysaccharides proteins DNA RNA
Monomers: monosaccharides amino acids deoxyribonucleotides ribonucleotides

All eukaryotic organisms have cells of the following generalized structure.



All living organisms can be divided into four kingdoms. The figures in brackets show the number of species (in thousands) in each subkingdom.

Animals	Plants	Fungi	Prokaryotes
sponges (4) unicells (40) multicells (1 000–2 000)	eukaryotic algae (20) true plants (330)	slime moulds (0.5) true fungi (100)	bacteria (1.6) blue-green bacteria (formerly termed blue- green algae) (1.5)

F	Science and the planet Earth	19	Life and evolution
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4	Practical work in science	22	Biochemistry
5-6	Into the Earth: earthquakes,	23	Physiology
	seismology and the Earth's magnetism	24	DNA: molecular aspects of genetics
7-8	Plate tectonics: a revolution in	25	Ecology
	the Earth sciences	26	Biology reviewed
9	Energy	27	Earth materials and processes
10	Modelling the behaviour of light	28-29	Geological time and Earth
11-12	Atomic structure		history
13-14	Chemical reactions and the Periodic Table	30	Quantum mechanics: an introduction
15	Chemical equilibrium	31	Quantum mechanics: atoms and
16	Chemical energetics		nuclei
17–18	The chemistry of carbon compounds	32	The search for fundamental particles



Unit 22 Biochemistry

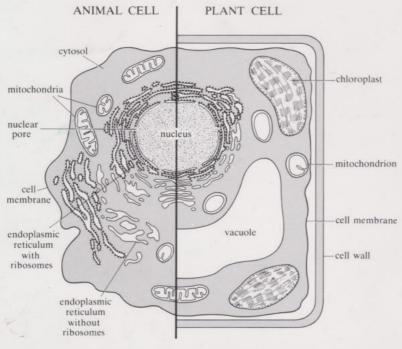
Unit 23 Physiology

### USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

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16	Chemical energetics		nuclei
17-18	The chemistry of carbon	32	The search for fundamental
	compounds		particles



Unit 24
DNA: molecular aspects of genetics

Unit 25 Ecology

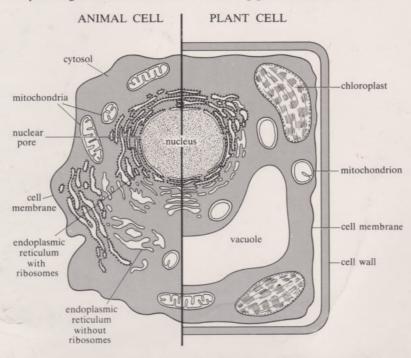
Unit 26 Biology reviewed

### USEFUL INFORMATION FOR THE BIOLOGY UNITS: CHEMICALS, CELLS AND CLASSIFICATION

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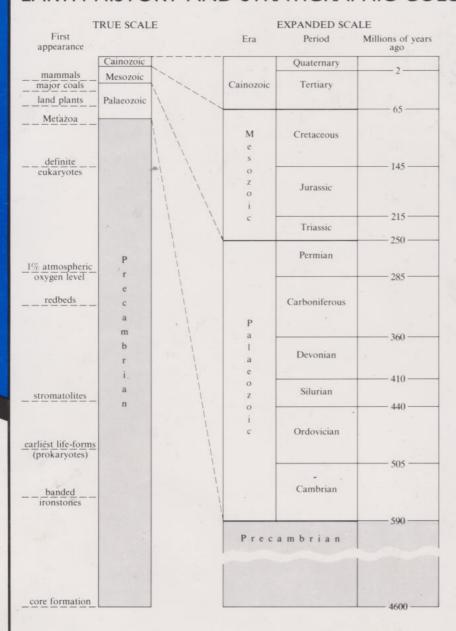
Science and the planet Earth	19	Life and evolution
Measuring the Solar System	20	Inheritance and cell division
Motion under gravity	21	Genes and evolution
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Into the Earth; earthquakes,	23	Physiology
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the Earth sciences	26	Biology reviewed
Energy	27	Earth materials and processes
<ul> <li>In the second of the second of</li></ul>	28-29	Geological time and Earth
Atomic structure		history
Chemical reactions and the Periodic Table	a 30 €	Quantum mechanics: an introduction
Chemical equilibrium	7 31/1/	Quantum mechanics: atoms and
		nuclei
The chemistry of carbon compounds	32	The search for fundamental particles
	Measuring the Solar System Motion under gravity Practical work in science Into the Earth: earthquakes, seismology and the Earth's magnetism Plate tectonics: a revolution in the Earth sciences Energy Modelling the behaviour of light Atomic structure Chemical reactions and the Periodic Table Chemical equilibrium Chemical energetics The chemistry of carbon	Measuring the Solar System  Motion under gravity  Practical work in science  Into the Earth: earthquakes, seismology and the Earth's magnetism Plate tectonics: a revolution in the Earth sciences Energy Modelling the behaviour of light Atomic structure Chemical reactions and the Periodic Table Chemical equilibrium Chemical energetics The chemistry of carbon  20 22 23 24 25 26 26 27 27 28 29 27 27 27 28 29 27 29 20 20 21 21 22 29 20 20 20 21 21 22 20 21 22 21 22 23 24 25 26 27 27 27 27 27 28 28 29 27 27 20 20 20 20 20 21 21 21 22 22 23 24 25 26 27 27 27 28 28 29 27 27 27 28 28 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20



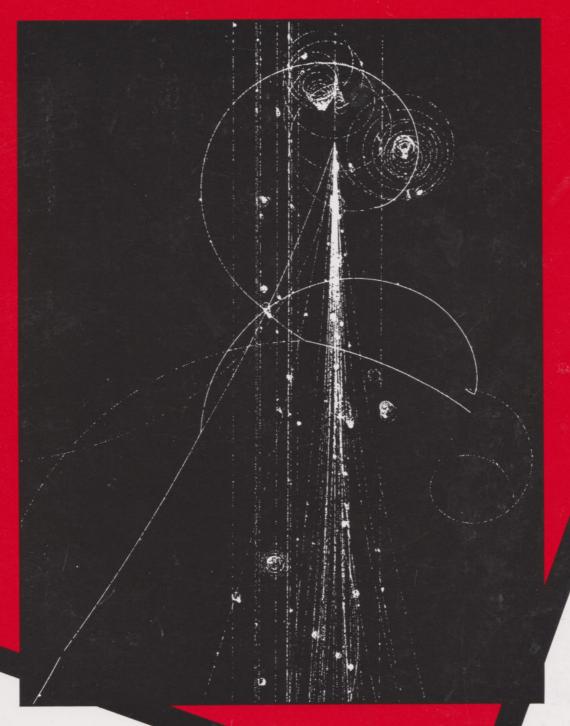
Unit 27
Earth materials and processes

Units 28 - 29
Geological time and Earth history

### EARTH HISTORY AND STRATIGRAPHIC COLUMN



	Science and the planet Earth	19	Life and evolution
2	Measuring the Solar System	20	Inheritance and cell division
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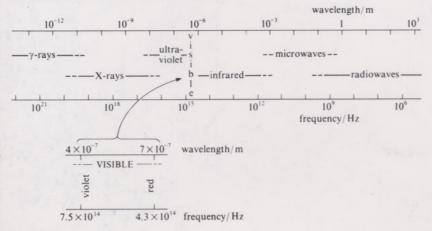
Unit 30
Quantum mechanics:
an introduction

Unit 31
Quantum mechanics:
atoms and nuclei

Unit 32
The search for fundamental particles

### USEFUL INFORMATION FOR THE PHYSICS AND GENERAL SCIENCE UNITS

#### ELECTROMAGNETIC SPECTRUM



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	Geological time and Earth